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Date: January 4, 2006

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Examiner:	Usha Raman		
Group Art:	2617		
Company:	U.S. PTO		
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MESSAGE

RE: U.S. Patent Application of Oliver L. Richards et al.
Entitled: Low Noise Block Supply and Control Voltage Regulator
Filed on: November 17, 1999
U.S. Appl. No.: 09/441,119
Our Ref. No.: ALLEG-017PUS

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No.	:	09/441,119
Applicant	:	Oliver L. Richards et al.
Filed	:	November 17, 1999
T.C./A.U.	:	2617
Examiner	:	Usha Raman
Docket No.	:	ALLEG-017PUS
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Jan 4, 2006
Date of Signature and Mail Deposit

By: Kermit Robinson
Reg. No. 48,734

REPLY BRIEF UNDER 37 C.F.R. 41.41

MS Appeal Brief-Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the final Official Action dated April 20, 2005, which finally rejected Claims 1-14 in the above-identified application, and in response to the Examiner's Answer dated November 16, 2005, please consider the reply set forth below.

Claims currently in the application are provided as an attachment A1 hereto for the convenience of the Examiner.

Grounds of Rejections to Be Reviewed On Appeal

Issues presented for appeal include the following:

1. Whether Claims 1-11 are unpatentable under 35 U.S.C. 103(a) as being obvious over the LNBP10 reference in view of Vizer.

2. Whether Claims 12-14 are unpatentable under 35 U.S.C. 103(a) as being obvious over the LNBP10 reference in view of Vizer and Mammano et al. is not discussed. Claims 12-14 stand or fall with Claim 11 as recited below.

REPLY

Applicants set forth a number of detailed arguments in an Appeal Brief filed August 19, 2005, and continue to rely upon those arguments. Applicants respond herein to specific assertions made by the Examiner in a Response to Argument within the Examiner's Answer dated November 16, 2005.

With regard to the LNBP10 reference, in the Response to Argument, the Examiner asserts, "the LNBP10 reference is silent about the number of voltage sources required to provide the plurality of voltage levels." Applicants respectfully disagree.

Applicants respectfully direct the Examiner's attention to pages 11/18 through 14/18 of the LNBP10 reference, where seven different typical application schematics are shown. In each schematic, inputs of 17V and 24V are shown on separate inputs (i.e., pins), requiring two separate voltage sources. No embodiment, using but one voltage source, is shown in the typical application schematics.

As described in the Appeal Brief filed August 19, 2005, the LNBP10 reference attempts to achieve a high efficiency, but in an ***entirely*** different way than the present invention.

As described in Applicant's Background of the Invention section, the LNBP10 reference describes the "LNB supply and control voltage regulator" circuit comprising a linear amplifier to which power can be supplied from one of two voltage sources depending on the desired output voltage, in order to reduce the power dissipation in the linear amplifier. Essentially, when a lower output voltage from the LNBP10 device is selected, a second voltage source having lower voltage is also selected, resulting in a reduced voltage drop across the linear amplifier from that which would be achieved if only one voltage source having a higher voltage were used. Thus, the LNBP10 reference provides a *particular* solution for reducing power dissipation in the linear amplifier.

Therefore, contrary to the Examiner's assertion, Applicants submit that the LNBP10 reference clearly describes using exactly two voltage sources as a primary technique in order to achieve power reduction.

Also with regard to the LNBP10 reference, in the Response to Argument, the Examiner asserts, "the LNBP10 reference states that the same voltage source output may be coupled to Vcc1 and Vcc2 supply pins without affecting any other circuit performance."

Applicants respectfully submit that the Examiner has omitted significant surrounding words from the LNBP10 reference. On page 1/18, the LNBP10 reference recites:

> [i]f adequate heatsink is provided and *higher power losses* are acceptable, both supply pins can be powered by *the same 23V source* without affecting any other circuit performance." [emphasis added]

Therefore, in an arrangement of the LNBP10 reference in which both supply pins are coupled to one voltage source, the LNBP10 reference contemplates only a single *fixed* 23V voltage source, resulting in higher power losses.

Applicants also submit that the LNBP10 reference does not recognize a combination, which includes a voltage source that is made to be "greater than said selected DC voltage level by a predetermined amount," as set forth in independent Claims 1, 7, and 11. It is also recited in

the claims that the "selected DC voltage level" is selected from a "plurality of DC voltage levels," rendering the claimed switch-mode power supply to have an adjustable output voltage accordingly. Applicants submit that the adjustability feature is not a new claim limitation, but is an outcome of the existing claim recitations.

Furthermore, Applicants submit that the LNBP10 reference, in the above passage used by the Examiner, teaches away from the claimed arrangement having a voltage source that is made to be "greater than said selected DC voltage level by a predetermined amount." The passage used by the Examiner to show a single voltage source used by the LNBP10 reference contemplates only a single *fixed* 23V voltage source and does not contemplate a voltage source "greater than said selected DC voltage level by a predetermined amount," as set forth in Claims 1, 7, and 11.

Furthermore, in the above passage used by the Examiner, Applicants submit that the LNBP10 reference teaches still further away from the claimed arrangement in recognizing that, with a single *fixed* voltage source, the LNBP10 reference would suffer "*higher power losses*." In contrast, as described throughout the specification and as will be recognized to one of ordinary skill in the art, the claimed arrangement having a voltage source "greater than said selected DC voltage level by a predetermined amount " provides *lower power losses*.

With regard to Applicants submissions in their Appeal Brief filed August 19, 2005 concerning the relative cost of linear and switch-mode power supplies, Applicants stated:

> Applicants suggest, for example, that a switched-mode power supply as in Vizer is more complex than a linear power supply used by the LNBP10 reference, and also requires the use of magnetic elements. Furthermore, in some satellite systems, one or both of the two linear voltage sources used by the LNBP10 reference might already be present for other purposes, and therefore, addition of a switch-mode power supply as in Vizer might add size and cost.

With regard to the above statement made by the Applicants, in the Response to Argument, the Examiner asserts "Applicant's arguments are irrelevant, as none of these factors affect the scope of Claim 1." Applicants respectfully point out that the rejection being discussed in the above passage is a rejection of Claim 1 under 35 U.S.C. 103(a) using a combination of the LNBP10 reference with Vizer. Contrary to the Examiner's assertion, Applicants respectfully submit that relative cost is a relevant factor to consider when determining whether there exists the requisite *motivation to combine references* in a rejection under 35 U.S.C. 103(a).

As stated in the Appeal Brief filed August 19, 2005:

> [a]s found in MPEP §2142, in order to establish a prima facie case of obviousness "...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."

Using relative cost as a factor evidencing a *lack of motivation to combine references*, as well as other factors establishing lack of motivation to combine described in the Appeal Brief filed August 19, 2005, Applicants again respectfully submit that the Examiner has not met the above burden in order to establish prima facie obviousness.

The Examiner goes on to assert that "Applicant's allegations that 'the addition of Vizer might add size and cost' are baseless and unsubstantiated, and seem to be based on probabilities derived from misplaced contentions." Applicants respectfully disagree.

As an initial matter, Applicants would like to emphasize their previous statement and submit that the use of the switching regulator of Vizer with the LNBP10 reference *does add* size and cost over the linear regulators used by the LNBP10 reference. An exemplary switch-mode power supply is shown in Figure 3 of the present application. However, one of ordinary skill in the art will understand that certain components have been omitted from the switch-mode power supply of Figure 3 for clarity.

Applicants submit that one of ordinary skill in the art would understand that a switch-mode power supply is generally more expensive and generally requires more circuit board area than a linear power supply. In particular, as described in the Appeal Brief filed August 19, 2005, "Applicants suggest, for example, that a switched-mode power supply as in Vizer is more complex than a linear power supply used by the LNBP10 reference, and also requires the use of *magnetic elements*." [emphasis added] Magnetic elements having inductance values suitable for use in switch-mode supplies are known to be relatively large and relatively expensive.

In support thereof, Applicants have made comparisons between linear power supply circuits and switch-mode power supply circuits. Applicants submit that an exemplary linear power supply circuit generally requires three electronic components, namely a linear voltage regulator integrated circuit and two capacitors. In contrast, Applicants submit that an exemplary switch-mode power supply circuit generally requires eleven electronic components, namely a switch-mode voltage regulator integrated circuit, three resistors, five capacitors, one precision diode, and one low-loss inductor. Therefore, Applicants submit that a switch-mode power supply circuit has more components and greater complexity, and thus, tends to have higher cost and require more circuit board area than a linear power supply circuit.

Therefore, Applicants again state that one of ordinary skill in the art considering the LNBP10 reference, already having one method to reduce power consumption, would not be motivated to make a combination with Vizer, using a switch-mode power supply, and would in fact be deterred from doing so because of the greater expense and circuit board area associated with the Vizer switch-mode power supply.

Claims 2-6 depend from and thus include the limitations of Claim 1. Claims 8-10 depend from and thus include the limitations of Claim 7. Claims 12-14 depend from and thus include the limitations of Claim 11. Thus, Applicants again submit that Claims 2-6, 8-10, and 12-14 are patentably distinct over the cited references, at least for the reasons discussed above in conjunction with Claim 1, 7, and 11.

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Reply Brief

Docket No. ALLEG-017PUS

In view of the above, Applicants submit that Claims 1-14 and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845, including but not limited to, any charges for extensions of time under 37 C.F.R. §1.136.

Respectfully submitted,

Dated: Jan 4, 2006

DALY, CROWLEY, MOFFORD & DURKEE, LLP

By: _____

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Attachments: Listing of claims currently in the application

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A1: Claims Currently in the Application

1. (Original) A circuit for providing a power and control signal selected from a plurality of DC voltage levels and being modulated by an analog AC tone signal to satellite receiver apparatus on a single conductor, comprising:

a switch-mode power supply having an input port to which an input voltage is applied, a feedback port responsive to a reference voltage indicative of said selected DC voltage level, and an output port at which a regulated output voltage is provided, wherein said regulated output voltage is greater than said selected DC voltage level by a predetermined amount; and

a linear amplifier having an input port coupled to said output port of said switch-mode power supply, a control port to which said reference voltage indicative of said selected DC voltage level is applied, and an output port at which an output voltage having the selected DC voltage level and being modulated by the analog AC tone signal is provided.

2. (Original) The circuit of claim 1 wherein said satellite receiver apparatus comprises a low noise block converter of a satellite television system.

3. (Original) The circuit of claim 1 further comprising a signal generator for generating said analog AC tone signal and for applying said analog AC tone signal to said linear amplifier.

4. (Original) The circuit of claim 1 wherein said switch-mode power supply is a buck converter.

5. (Original) The circuit of claim 1 wherein said switch-mode power supply is a boost converter.

6. (Original) The circuit of claim 1 wherein said output port of said linear amplifier comprises a first output port portion and a second output port portion and wherein said output voltage of said linear amplifier is provided at a selected one of said first and second output port portions in response to an output port control signal.

7. (Original) A method for providing a power and control signal selected from a plurality of DC voltage levels and being modulated by an analog AC tone signal to satellite receiver apparatus on a single conductor, comprising the steps of:

selecting one of said plurality of DC voltage levels;

providing a regulated output voltage with a switch-mode power supply, said regulated output voltage having a voltage level greater than said selected DC voltage level by a predetermined amount; and

applying said regulated output voltage to a linear amplifier, said linear amplifier providing an output voltage having said selected DC voltage level and being modulated by said analog AC tone signal.

8. (Original) The method of claim 7 further comprising the step of providing said output voltage of said linear amplifier to a low noise block converter of a satellite television system.

9. (Original) The method of claim 7 further comprising the steps of:

generating said analog AC tone signal; and

applying said analog AC tone signal to said linear amplifier.

10. (Original) The method of claim 7 wherein said linear amplifier provides said output voltage at a selected one of a plurality of output ports.

11. (Previously Presented) A circuit for providing a power and control signal selected from a plurality of DC voltage levels and being modulated by an analog AC tone signal to a low noise block converter of a satellite television system on a single coaxial cable, comprising:

a switch-mode power supply having an input port to which an input voltage is applied, a feedback port to which a reference voltage indicative of said reference voltage level is applied, and an output port at which a regulated output voltage is provided, wherein said regulated output voltage is greater than said selected DC voltage level by a predetermined amount;

a linear amplifier having an input port coupled to said output port of said switch-mode power supply, a control port to which said reference voltage indicative of said selected DC voltage level is applied, and an output port at which an output voltage having the selected DC voltage level is provided; and

a signal generator for generating said analog AC tone signal and for applying said analog AC tone signal to said linear amplifier, wherein said output voltage of said linear amplifier is modulated by said analog AC tone signal.

12. (Original) The circuit of claim 11 wherein said switch-mode power supply comprises:

an error amplifier having a first input responsive to said reference voltage, a second, feedback input, and an output at which an error signal is provided;

a pulse-width-modulation comparator responsive to said error signal for providing a transistor drive signal;

a transistor having a first terminal to which said input voltage is applied, a second terminal, and a control terminal responsive to said transistor drive signal; and

an inductor having a first terminal coupled to said second terminal of said transistor and a second terminal at which said output voltage of said linear amplifier is provided, wherein said output voltage is coupled to said feedback input of said error amplifier.

13. (Original) The circuit of claim 12 further comprising an offset voltage generator coupled between said reference voltage and said first input of said error amplifier.

14. (Previously Presented) The circuit of claim 12 wherein said error amplifier and said pulse-width-modulation comparator comprise a current mode pulse-width-modulation controller.